

Patent claims

1. A method for controlling the transition between a normal operation and an overrun fuel cut-off operation in an Otto

5 engine (20) which is operated with direct fuel injection, wherein the ignition angle (ZW) is adjusted in a retard (s) direction in order to avoid an unacceptable torque jump which occurs in the case of the overrun fuel cut-off as a result of cutting off the fuel injection, **characterized in**  
10 **that** fuel is injected into a cylinder of the Otto engine (20) in the form of a multiple injection, wherein at least a partial quantity of the fuel that must be injected is deposited during the compression phase.

15 2. The method as claimed in claim 1, **characterized in that** the air mass that is taken in is first reduced and the ignition angle (ZW) is subsequently decreased to a first minimal value which is predetermined for this operating mode and at which a reliable combustion of the fuel-air mixture is  
20 still guaranteed.

3. The method as claimed in claim 2, **characterized in that** after the minimal value for the ignition angle (ZW) has been reached, the partial quantity of the fuel that must be  
25 injected is injected during the compression phase of the Otto engine (20).

30 4. The method as claimed in claim 1 or 2, **characterized in that** the entire fuel quantity is injected in the compression phase.

5. The method as claimed in one of the preceding claims, **characterized in that** the ignition angle (ZW) is decreased to a lower second minimal value which is predetermined for

the multiple injection.

6. The method as claimed in one of the preceding claims, **characterized in that** after the second minimal value has been reached, the fuel injection is cut off and a switchover to overrun operation takes place.
7. The method as claimed in one of the preceding claims, **characterized in that** in order to return to the normal operation of the Otto engine (20), initially at least a partial quantity of the fuel which must be injected is deposited in the compression phase.
8. The method as claimed in claim 7, **characterized in that** the ignition angle is adjusted in the advanced ignition (f) direction in order to build up the torque.
9. The method as claimed in claim 8, **characterized in that** when the desired torque is reached, switchover to the injection in the intake phase takes place.
10. An apparatus for controlling the transition between the normal operation and the overrun fuel cut-off and vice versa in an Otto engine (20) which is operated with direct fuel injection as claimed in one of the preceding claims, including a device for capturing the torque (DM) and the ignition angle (ZW), including an adjustment device for the ignition and the air mass which is taken in, including a control device for the fuel injection and including a control program, **characterized in that** the program is designed to reduce the ignition angle (ZW) and subsequently to inject the fuel in the compression phase of the Otto engine (20).
11. The apparatus as claimed in claim 10, **characterized in that**

the fuel can be injected in at least two partial quantities.